

MATERNAL NIGHT BLINDNESS IN NEPAL : HEALTH RISKS AND CONSEQUENCES

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ABSTRACT :

Maternal night blindness is a problem of public health significance in vitamin A deficient areas of the world. In South and South-east Asia the condition is widely prevalent, especially during pregnancy. In Nepal, 10-20% of women during pregnancy and 5% of women during lactation experience night blindness. Two studies from the terai of Nepal provide insight into the risk factors and consequences of night blindness occurring in pregnancy. Women in Sarlahi consider "ratandho" (night-blindness) to be an important and severe illness of pregnancy for which they may seek treatment. It also adversely affects their day to day work activities and increases their reliance on other family members. Pregnant night blind women are vitamin A-deficient, reflected by a 4-fold higher risk of low serum retinol level ($<20\mu\text{g/dl}$) in these women compared to normal pregnant women. Night blind women are also likely to be wasted, ill, and anemic than women without night blindness. Women who suffered from night blindness during pregnancy were at a higher risk of dying in the subsequent two year period than women who did not experience night blindness. We recommend that night blindness be used as a simple tool to identify high risk women during pregnancy for antenatal care and nutritional intervention.

Key words : night blindness, pregnancy, Sarlahi, vitamin A deficiency.

INTRODUCTION :

In developing countries where vitamin A deficiency is endemic, night blindness is one of the first clinical symptoms to occur in

preschool age child populations. Night blindness is caused by an inability of the rod cells in the retina of the eye, due to an inadequacy of vitamin A, to generate a photosensitive pigment called rhodopsin, which is required

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to see in dim illumination. This condition, while common in children, has received little attention among adults. In the 1960s night blindness was found among pregnant women in India presenting at clinics, which, in some cases, responded to treatment with high doses of vitamin A. Night blindness occurring during pregnancy is unique as it manifests in the latter half of pregnancy and disappears spontaneously after delivery, although it may reappear in some instances during lactation. Recently, research in Nepal has brought this problem to the forefront. Several reports of the prevalence of night blindness have emerged from surveys conducted in different regions of Nepal that range from 8% to 52% during pregnancy and 5-6% during lactation^{3,4} (Linehan et al 1996). The national average estimate of night blindness prevalence according to a recent demographic health survey is 18% although its prevalence varies substantially by district.

This paper describes the findings of two studies on night blindness carried out in Sarlahi district in the southern terai region of Nepal. The first was an ethnographic research study investigating the communities' perceptions of its importance, causes, and treatments. The second was a case-control study designed to examine the nutritional and health-related risk factors of night blindness during pregnancy.

I. ETHNOGRAPHIC STUDY

Materials and Methods :

The purpose of this study was to identify local terms and concepts of maternal night blindness, investigate women's perceptions of its causes, and descriptions of its treatment and consequences. The study was conducted in three village development committees (VDCs) of Sarlahi district during September through November of 1993.

Qualitative research methods including in-depth interviews, free-listing, and quick-sort ranking were used. In all 38 interviews were conducted with pregnant women (some of whom had a current or previous history of night blindness), lactating women, traditional birth attendants, and women with children. The interviews provided case-histories of night blindness and pregnancy narratives which covered domains of women's illness, diet, beliefs related to pregnancy and lactation, and treatment seeking behavior. Free-listing was done using a standard question to obtain a list of women's illnesses ($n=25$)⁸, these same women were asked to rank 15 of the most commonly mentioned women's illnesses in order of perceived severity⁹.

Results :

The term used for night blindness in the three languages spoken in this part of the terai were "ratauni" in Maithili, "ratandho" in Nepali and "rataunji" in Tharu, although a majority of women understood these terms, some women described the symptoms of the condition such as "poor vision at night" when referring to it. Other descriptions of the symptoms were "smoke in the eyes" and "haziness". The onset of night blindness was mostly in the late second or third trimester. Most women reported that it usually disappeared soon after delivery, although some said it could recur during lactation. A majority of the women believed night blindness to be associated with pregnancy and attributed "pregnancy" to be its cause. This is suggested from a quote from a Maithili woman. She said: "*Don't know what causes it ... it happens to some women who are pregnant, like the swelling of hands and feet. It happens on its own, because of the pregnancy.*" "Kamjori" (weakness) and "Garmi" (hotness) were also mentioned frequently as causes of night blindness in women. Women tended not to seek any

treatment for night blindness, although some mentioned treating it with vitamin A "goti" (pills), available cheaply at local pharmacies and shops. The most common pills were small, round and red in color with 5,000 IU of vitamin A and IU of vitamin D. These were popularly known as "ratandhogoti" although none of the women appeared to know that they contained vitamin A.

Night blindness was ranked second (to vaginal bleeding) in perceived severity among the 15 most frequently mentioned illnesses by women. This ranking suggests that women considered it a serious illness. Apart from this, night blindness was perceived to impact on women's night time work activities. Direct observations of two women suffering from night blindness at night revealed that while women could work in the light of a fire, they were rendered inactive when they moved away from this source of light. Women reported relying on other family members for various activities such as child care and cooking, as well as having to curb outdoor activities such as fetching water in the evening. They also described difficulty in eating, accidents and other problems such as the social stigma attached to being night blind.

Women did not draw a direct association between food intake and night blindness, although a couple of women mentioned eating "cold" foods to counter-act the hotness of the body which they believed caused night blindness. However, food-related beliefs and practices of pregnancy are important to understand the relationship between diet and night blindness during pregnancy. With the research we were able to provide an understanding of the cultural context within which night blindness occurs during pregnancy, and its saliency in the lives of women living in rural southern Nepal.

II. CASE-CONTROL STUDY

Materials and Methods :

Subsequent to the ethnographic study, a population based, case-control study of night blindness during pregnancy was carried out to explore the risk factors associated with this condition (Christian et al 1998). This study was conducted in 19 of the 30 VDCs of Sarlahi district where the Nepal Nutrition Intervention Project-Sarlahi (NNIPS) was underway, supplementing women of reproductive age with vitamins. Local women distributed the supplements to women in their area and identified those who became pregnant. The local distributors were trained to obtain night blindness histories using local terms for the condition from all pregnant women in the community they served. Pregnant women were asked "*tapailai ahile ratandho bhaeko cha ?*" (or the appropriate equivalent in Maithili/Tharu) every week from the time they became pregnant until the termination of the pregnancy. Women reporting night blindness were verified by a team of data collectors who were trained to interview women about their symptoms and the impact night blindness had on their activities. Women who reported poor vision during daytime were considered to be "false" cases and were not enrolled in the study. Over a period of 15 months, 117 cases were identified and enrolled in the study. The same number of controls were randomly selected from the pool of women who were pregnant but did not have night blindness. The controls were matched with the cases for their gestational month of pregnancy. After selection, cases and controls were visited in their homes within a week for an interview and an examination. Data were collected on women's previous 7-day frequency of intake of certain vitamin A-rich foods, morbidity history, and household socioeconomic characteristics. Capillary blood was drawn by finger stick for serum

retinol, β -carotene, and hemoglobin (Hb) estimation. anthropometric measurements included weight, height, mid-upper arm circumference (MUAC) and triceps skinfolds (TSF)¹⁰.

Results :

While cases and controls were similar with respect to age and the number of previous pregnancies, cases had lower socioeconomic status, were less likely to be literate, and belonged to a lower caste than controls. The mean gestational age of cases and controls was 7 months.

The following table shows the differences in various nutritional status indicators between cases and controls.

	Case Mean	Control Mean	Mean difference (SE)
Serum retinol ($\mu\text{g/d}$)	20.6	29.4	-8.6* (1.42)
Hb (g/d)	8.9	9.6	-0.7* (0.22)
Weight (kg)	45.2	47.7	-2.6* (0.63)
Height (cm)	149.6	151.0	-1.3 (0.72)
MUAC (cm)	21.8	22.7	-0.9* (0.23)
BMI (wt/ht^2)	20.2	20.9	-0.8* (0.22)
TSF (mm^2)	8.7	9.5	-0.8* (0.34)

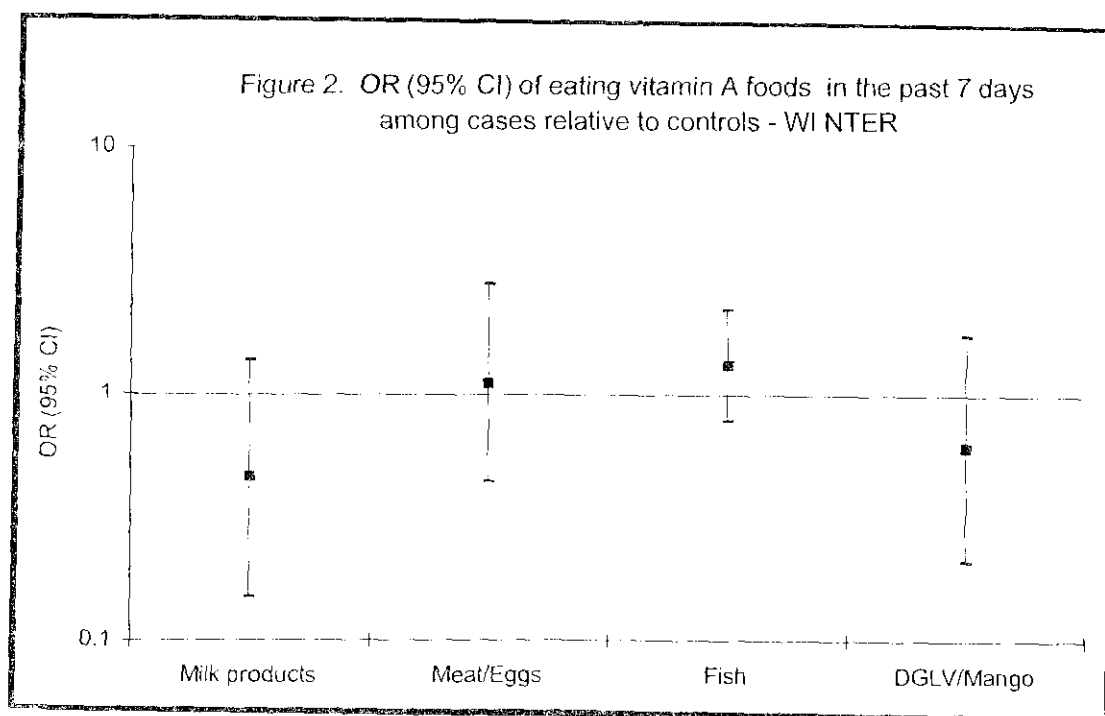
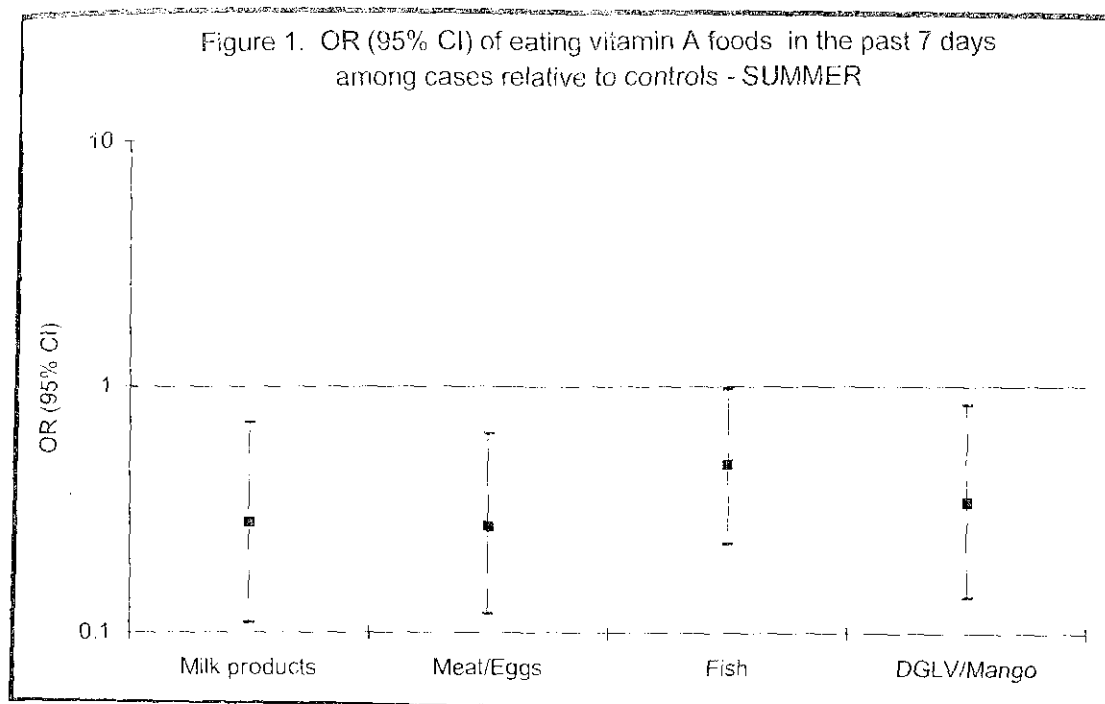
* $p < 0.05$

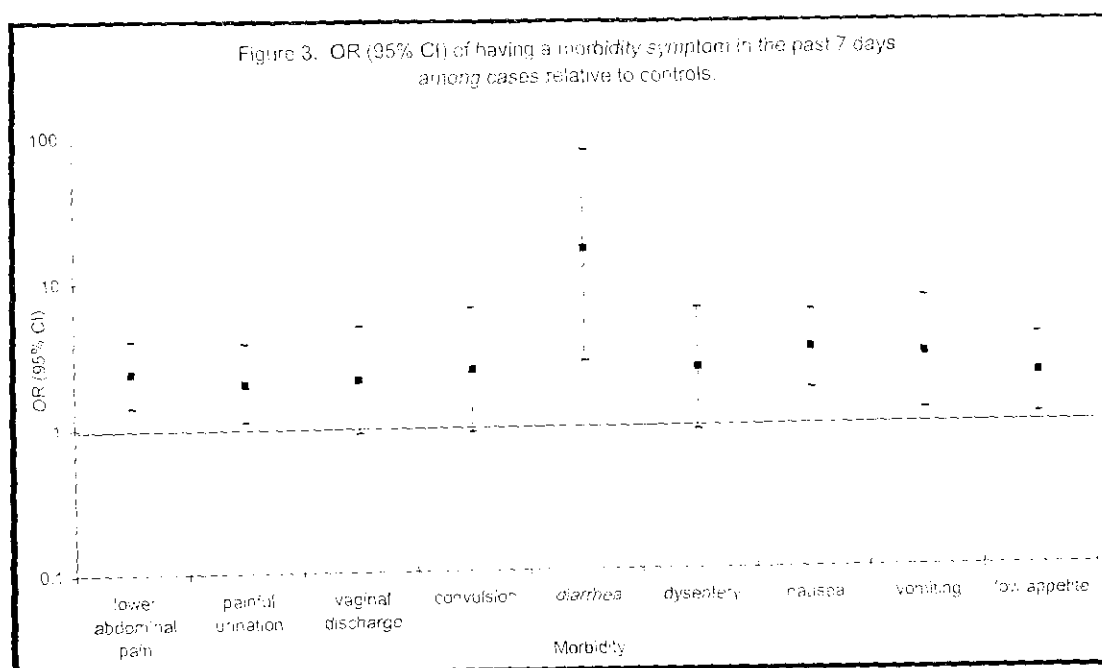
These data clearly show that cases were exposed to an excess risk of vitamin A deficiency compared to controls. At the same time in pregnancy, cases had $-9 \mu\text{g/dl}$ lower serum retinol and were 4 times more likely (95% confidence interval 2.2 - 7.4) to have low serum retinol levels ($< 20 \mu\text{g/dl}$) than controls. Hb levels were also significantly ($p < 0.05$) lower among cases (by 0.7 g/dl) and were three times more likely to be $< 7 \text{ g/dl}$

(cut-off for severe anaemia) than controls. women with night blindness had significantly ($p < 0.05$) lower body weight, MUAC, body mass index (BMI) and TSF than controls, suggesting that protein-energy malnutrition could contribute to night blindness.

Cases were 2-3 times likely to have consumed preformed and carotenoid sources of vitamin A in the past week than the controls in the summer months of April through September (Figure 1). This difference was statistically significant for all four food groups examined. In winter, lasting from October through March (figure 2), however, only milk and milk products (whey and cream) and carotenoid sources (dark green leafy vegetables and mango) tended to be consumed less by cases than controls, whereas meat, eggs, and fish were equally likely to be eaten by cases and controls. This seasonal variation in the risk of inadequate intake of vitamin A foods suggests that targeting women during a season of low food availability and access may be an effective strategy to adopt for nutrition intervention programs.

Seven-day morbidity histories were obtained at the time of the night blindness episode among cases and at the same time in gestation among controls. Cases were 2-3 times more likely to report symptoms of urinary/reproductive tract infections such as lower abdominal pain, painful urination, and vaginal discharge (Figure 3). Cases were also significantly more likely to report diarrhoea as well as symptoms of upper gastrointestinal infection such as nausea, vomiting, and low appetite in the previous week. Although not presented here, our data also show that an acute phase response following an infection may be strongly associated with hyporetinemia in these women, especially night blind women.





DISCUSSION :

Night blindness occurs commonly in the latter half of pregnancy, affecting 18% of pregnant women nationwide. Night blind pregnant women in rural Nepal are exposed to not only a risk of vitamin A deficiency, a known determinant of the condition, but also other risks including anaemia, protein energy malnutrition, and infectious and non-infectious illnesses. Preliminary analysis suggests that unintervened women who reported night blindness during pregnancy were at a 7-fold night blindness⁸. A simple history of maternal night blindness may help to identify high-risk pregnancies and should be included in antenatal assessment and care programs. symptoms of blurred or hazy vision at dusk with adequate vision during the daytime may be used to verify the history. Night blindness is perceived to be an important illness of pregnancy which may affect a woman's role as a caretaker and mother and impact her day to day actively pattern. This condition, which has not received sufficient

attention previously, should be routinely investigated to further define its extent and to develop effective food-based and other strategies for its prevention. Night blindness history can serve as a simple tool to identify high risk women for antenatal and postnatal care.

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